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[71] 申请人 郑学信

地址 100022 北京市朝阳区垂杨柳北区 20 楼 3 单元 71 号

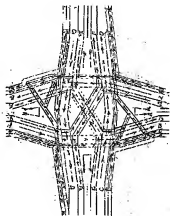
[72] 发明人 郑学信

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[54] 发明名称 一种新型城市公路立交桥

[57] 摘要

一种新型城市公路立交桥由来往主道、来往主桥、四条左转线、四条右转线、四条非机动车直行线、四条调头线组成一个三层的立交桥系统。四条左转线分别自然直接与右方直行线顺向平滑切入汇合,完成直接左转向。该桥各个方向行车均单行流畅,没有冲突点和交织点,而且占地面积极小,直径仅 140 米,造价小,只设单一的车行路线,没有复杂的路标,并且实现了机动车与非机动车分离行驶。同时各个方向还设有车辆调头线,较好的解决了交通堵塞的难题。



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1、一种新型城市公路立交桥由来往主道 AB ( $A_1B_1$ )、来往主桥 CD ( $C_1D_1$ )、四条左转桥 EF ( $E_1F_1$ 、 $E_2F_2$ 、 $E_3F_3$ )、四条右转桥 GH ( $G_1H_1$ 、 $G_2H_2$ 、 $G_3H_3$ )、四条非机动车直行线 LM ( $L_1M_1$ 、 $L_2M_2$ 、 $L_3M_3$ )、四条调头线 NP ( $N_1P_1$ 、 $N_2P_2$ 、 $N_3P_3$ ) 组成一个三层的立交桥系统, 其特征在于: 此桥直径 140 米, 高 4 米, 深 4 米, 主道直行线呈斜坡槽状, 宽 12 米, 槽底深 4 米, 槽底长度 75 米, 主桥直行高 1.7 米, 宽 12 米, 上下坡度长度为 95 米, 四条左转线分上下层, 从四面向桥心交叉汇合, 中心宽度为 16 米, 拐弯中心长度 70 米, 右转桥完成转弯后, 直接与左方直行主线平滑切入汇合, 转弯高度为 2.5 米, 宽 5 米, 上下总长为 170 米, 四条非机动车道与机动车分离行驶, 完成左转弯和直行, 四个方向均设有一条调头线, 无需过桥直接调头, 然后与相对方向的主线切入汇合。

2、根据权利要求 1 所述的公路立交桥, 其特征位于: 主道上的两条左转线为高架桥, 高度 4 米, 宽度 8 米, 拐弯中心长度 70 米, 主桥上两条左转线呈斜坡槽状, 前段 70 米, 宽度 8 米, 槽底 2.3 米, 拐弯后段长度 30 米, 槽底深 3.5 米。

3、根据权利要求 1 所述的公路立交桥, 其特征位于: 主桥上的非机动车道 RO ( $R_1O_1$ )、SO ( $S_1O_1$ ) 高出地面 0.5 米, 通过 RO ( $R_1O_1$ ) 直接跨过主道完成直行, 主道的两条非机动车道呈斜坡槽状, 槽底深 2 米, 穿过主桥完成直行, 再通过 SO ( $S_1O_1$ ) 回转完成左转弯。

## 一种新型城市公路立交桥

### 技术领域:

本发明涉及交通运输领域,特别涉及一种设计新颖独特、构思巧妙、连接自然的一种新型城市公路立交桥。

### 背景技术:

鉴于近几年来,随着汽车工业的发展和人民生活水平的不断提高,汽车已经成为人们出行不可缺少的代步工具,由于汽车数量迅速增加,给城市交通带来巨大压力,加上城市内红绿灯过多,交通道路狭窄,所以造成交通堵塞的现象日趋严重。尤其是每当早晚高峰时间,城市交通便陷入一片瘫痪的状态,大街小巷到处都是爬行的汽车,形成了首尾不见的蠕动群体。其主要原因之一是,很多十字路口没有立交桥,全靠红绿灯控制,而现有的立交桥普遍是设计落后,结构不合理,采用苜蓿叶式、定向式、迂回式、环形及菱形等,其共同问题是左转弯车辆绕行远,并与一方直行车辆相交,形成交织点,使后面车辆不能行使,由于转弯车辆对主线车辆干扰太大,让汽车不能顺利通过,时间和能源都浪费在此,耽误多少重要的事情,再加上机动车与非机动车混合交织,造成混乱的局面,以至交通堵塞。ZL92105467公开了一种定向式立交桥,分五桥式和三桥式两种,其优点是占地小,且克服了左转弯绕迂回路途远的缺点,但相对两附桥两次立交影响行车,左转弯度急且与相对方向右转弯正交汇合干扰大,使行车不流畅、车速慢、行车安全性较差,此外由于结构复杂,且中央设分隔带,建设投资大。申请号为 00105270.5 的专利公开了一种高速直接转向式立交桥,其优点是往各个方向行车均单行流畅,实现了直接快速左转向,但占地面积大、造价高,而且没有解决机动车与非机动车分离行驶的问题。

### 发明内容:

本发明的目的在于提供一种结构独特紧凑,构思大胆巧妙,新颖别致,使各个环节连接自然,它不仅占地面积小,造价小,而且交通道路畅通无阻,左行车能直接快速左转向,没有冲突点和交织点,爬坡拐弯角度合理,机动车与非机动车分离行驶,美观大方实用的新型城市公路立交桥。

本发明的目的是通过如下技术方案实现的:一种新型城市公路立交桥由来往主道 AB ( $A_1B_1$ )、来往主桥 CD ( $C_1D_1$ )、四条左转桥 EF ( $E_1F_1$ 、 $E_2F_2$ 、 $E_3F_3$ )、四条右转桥 GH ( $G_1H_1$ 、 $G_2H_2$ 、 $G_3H_3$ )、四条非机动车直行线 LM ( $L_1M_1$ 、 $L_2M_2$ 、 $L_3M_3$ )、四条调头线 NP ( $N_1P_1$ 、 $N_2P_2$ 、 $N_3P_3$ ) 组成一个三层的立交桥系统。主道直行线呈斜坡槽状,槽底深 4 米,槽底长度为 75 米,主桥的两条直行线为高架桥,高 1.7 米,上下长度为 95 米。主道上的左转桥为两条高架桥,中间长度为 70 米,桥面呈上下斜坡状,顶端距地面 4 米,主桥的两条左转弯道呈斜坡槽状,槽底 2.3 米,长度为 70 米,四条左转线都在中心汇合,形成上下层,中心宽度为 16 米。四条左转线分别直接与右方直行线顺向切入汇合,完成直接左转向。每条主线分叉的右转线完成转弯后直接与左方直行线平滑切入汇合,转弯处高为 2.5 米,长度为 40 米。四个方向均设有一条调头线,无需过桥直接调转方向,然后与相对方向的主线切入汇合。主桥上的非机动车道 RO ( $R_1O_1$ )、SO ( $S_1O_1$ )

高出地面 0.5 米,通过 RO ( $R_1O_1$ ) 直接跨过主道完成直行。主道的两条非机动车道呈斜坡槽状,槽底深 2 米,穿过主桥完成直行,再通过 SO ( $S_1O_1$ ) 回转完成左转弯。

采用以上技术方案建造的立交桥,具有如下优点:

1. 此桥占地面积极小,直径 140 米,造价小,减少了投资,节省了财力人力,适合大中小城市建设。
2. 各个方向行车都是顺向行驶,没有冲突点和交织点,不需要回转交叉绕道行驶,也没有复杂的路标,让司机一目了然,彻底解决了交通堵塞的难题。
3. 实现了机动车与非机动车短距离的分离行驶,让司机没有顾虑

的开车。

4. 各个方向机动车都设有调头线，司机无需过桥即可调头，缩短了调头车距，节省了时间。

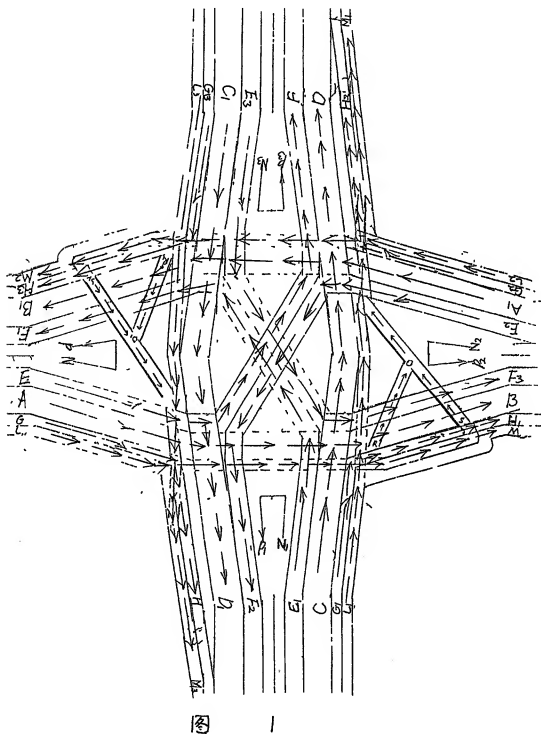
#### 附图说明：

图 1 为新型城市公路立交桥的平面示意图。

图中：AB、A<sub>1</sub>B<sub>1</sub> 为主道，CD、C<sub>1</sub>D<sub>1</sub> 为主桥，EF、E<sub>1</sub>F<sub>1</sub>、E<sub>2</sub>F<sub>2</sub>、E<sub>3</sub>F<sub>3</sub> 为左转桥，GH、G<sub>1</sub>H<sub>1</sub>、G<sub>2</sub>H<sub>2</sub>、G<sub>3</sub>H<sub>3</sub> 为右转线，LM、L<sub>1</sub>M<sub>1</sub>、L<sub>2</sub>M<sub>2</sub>、L<sub>3</sub>M<sub>3</sub> 为非机动车道，NP、N<sub>1</sub>P<sub>1</sub>、N<sub>2</sub>P<sub>2</sub>、N<sub>3</sub>P<sub>3</sub> 为调头线，RO、R<sub>1</sub>O<sub>1</sub>、SO、S<sub>1</sub>O<sub>1</sub> 为非机动车桥。

#### 具体实施方式：

一种新型公路立交桥由来往主道 AB (A<sub>1</sub>B<sub>1</sub>)，来往主桥 CD (C<sub>1</sub>D<sub>1</sub>)，四条左转桥 EF (E<sub>1</sub>F<sub>1</sub>、E<sub>2</sub>F<sub>2</sub>、E<sub>3</sub>F<sub>3</sub>)，四条右转桥 GH (G<sub>1</sub>H<sub>1</sub>、G<sub>2</sub>H<sub>2</sub>、G<sub>3</sub>H<sub>3</sub>)，四条非机动车直行线 LM (L<sub>1</sub>M<sub>1</sub>、L<sub>2</sub>M<sub>2</sub>、L<sub>3</sub>M<sub>3</sub>)，四条调头线 NP (N<sub>1</sub>P<sub>1</sub>、N<sub>2</sub>P<sub>2</sub>、N<sub>3</sub>P<sub>3</sub>) 组成一个三层的立交桥系统。主道直行线呈斜坡槽状，槽底深 4 米，槽底长度为 75 米，主桥的两条直行线为高架桥，高 1.7 米，上下坡长度为 95 米。主道上的左转桥为两条高架桥，中间长度为 70 米，桥面呈上下斜坡状，顶端距地面 4 米，主桥的两条左转弯道呈斜坡槽状，槽底 2.3 米，长度为 70 米，四条左转线都在中心汇合，形成上下层，中心宽度为 16 米。四条左转线分别直接与右方直行线顺向切入汇合，完成直接左转向。每条主线分叉的右转线完成转弯后直接与左方直行线平滑切入汇合，转弯处高为 2.5 米，长度为 40 米。四个方向均设有一条调头线，无需过桥直接调转方向，然后与相对方向的主线切入汇合。主桥上的非机动车道 RO (R<sub>1</sub>O<sub>1</sub>)、SO (S<sub>1</sub>O<sub>1</sub>) 高出地面 0.5 米，通过 RO (R<sub>1</sub>O<sub>1</sub>) 直接跨过主道完成直行。主道的两条非机动车道呈斜坡槽状，槽底深 2 米，穿过主桥完成直行，再通过 SO (S<sub>1</sub>O<sub>1</sub>) 回转完成左转弯。



## A NEW URBAN HIGHWAY OVERPASS

### Technical field

The present invention relates to the field of transport, especially relates to a new urban highway overpass.

### Background of the invention

With the improvement of the living standard of people, automobiles are more and more important, even become an indispensable means of transport, However, the sharp rise in the traffic volume causes serious traffic jams in urban traffic systems, too many traffic lights and too narrow roads made the phenomenon of traffic jam become more and more serious. Especially, on the overcrowded traffic time, urban transport will be plunged into a state of paralysis, the moving automobiles formed a huge peristaltic group. One of the main reason is many intersections has no overpass, but take traffic lights to control entirely. And the existing design of the overpass is generally backward, and the structure was always irrational, for example Cloverleaf-type, directional type, circular, ring and rhombic (rhombus).etc. Their common problem is that the distance for a left- turning is substantially long, and intersecting with going-straight vehicles, there is an intertwined point which made another vehicles cannot move. Because the turning vehicles brings too much interference to the vehicles on the main line, vehicles cannot pass smoothly, plus the motor vehicles and non-hybrid vehicles are intertwined, resulting in chaos and traffic congestion. z192105467 disclosed a directional open-style overpass, with the advantage is small occupied, and the left- turning vehicles should no longer drive long distance. But comparing to the influence to traveling crane of the two accessory bridge interchanging twice, the interference of the sharp left-turning camber and quadraturing and converging with the right-turning path of relative direction is larger. So that traffic is not smooth, the drive speed is low and the safety of driving is poor. In addition, due to the complex structure of the overpass, the investment of

construction is too big.00105270 disclosed a high-speed shift directly overpass. Its advantage is all direction is one-way traffic, vehicles can turn left directly and quickly. But this kind of overpass occupies an large area, and the cost is high, and does not resolve the separation of motor vehicles and non-motorized traffic problem.

#### Disclosure of the invention

The purpose of the present invention is to provide a unique compacted structure, the idea of overpass subtly bold, innovative and Unique, all links of the overpass connected natural, with the advantage of Small occupied area, tinny investment, and smooth traffic. Left-turning vehicles can turn left easily and directly without conflict and intertwined. The Turning point of climbing is reasonable, Motor vehicles and non-vehicle traffic is isolated, it is an elegant and practical new Urban highway overpass

The purpose of the present invention through the realization of technical solutions is as follows:

A new urban highway overpass, the three lays overpass system comprise: the main road AB(A1B1),the main bridge CD(C1D1), four left -turning bridges EF(E1Fj, E2F2, E3F3), four right-turning bridges GH(GjH1, G2H2, G3H3), four non-motorized going-straight lines LM(L1M1,L2M2,L3M3),four u-lines NP(N1P1,N2P2,N3P3)..the main straight-drive road appears slope trough-shaped , the depth of the groove is 4 meters and the length is 75 meters. Two going-straight line of the main bridge were Viaduct, with the height of 1.7meters and the length of 75 meters. Left-turning bridges on the main road were two viaducts, its middle length is 70 meters, the bridge surface appears slope trough-shaped , the top to floor is 4 meters, two left-turning roads of the main bridge appears slope trough-shaped, the bottom of the groove is 2.3 meters, and the length is 70 meters, the four left-turning lines convergenced in the center and form two layers. The width is 16meters, four left-turning lines convergence with straight-right line and complete left- turning directly.



Each right-turning line of the main line converges with going-straight line of left directly after turning. The height of turning is 2.5 meters with the length is 40 meters. There is a u-line set in all four directions. Vehicles can reversedirection without passing the bridge, and then convergence with the main line of relative direction. The non-motorized roads RO(R101), SO(S , 01) above the ground 0.5 meters , complete going-straight through RO(R101) to cross main road directly. The two non-motorized roads of main road appears slope trough-shaped , the depth of the slope bottom is 2 meters , across the main bridge to get going-straight, Then complete left-turning through so(s101).

Applying the above construction of the overpass technology has the following advantages:

1. Small occupied area, the diameter is 14 meters, tinny investment, save a lot of money and energy, this kind of overpass can widely constructed in large, medium and small-size cities.

2. Traffic in all directions are moving forward, there is no conflict and intertwined point, no need to drive in a roundabout route, nor the complex signs, so that drivers can driving easily , completely resolved the traffic congestion problems.

3. Realized the separated driving of the motor vehicle and non-motor in a short distance.

4. There is a U-turn lane set to Motor vehicles in all directions, the driver can turn round in short distance and time, without passing the overpass.

#### Brief description of the drawings

Figure 1 is a plan view of the new urban highway overpass

Wherein: AB, A1B1 are main Roads, CD, C1D1 are main bridges, EF, E1F1j, E2F2, E3F3 are left-turning bridges, GH, GIHL, G2H2, G3H3 are right-turning bridges, LM, L1M1, L2M2, L3M3 are non-motorized roads, NP, NiPl, N2y2, N2P3 are U-turn lines, RO, Ri01, SO, SiOl are non-motorized bridges.

#### Detailed description:

A new urban highway overpass, the three lays overpass system comprises: main

road AB(A1B1),main bridge CD(C1D1),four left- turning bridges EF(E1Fj、 E2F2、 E3F3), four right -turning bridges GH(GjH1、 G2H2、 G3H3),four non-motorized going-straight lines LM(L1M1,L2M2,L3M3),four u-lines NP(N1P1,N2P2,N3P3).the main going-straight road appears slope trough-shaped , the depth of the groove is 4 meters and the length is 75 meters. Two going-straight lines of the main bridge were Viaduct, with the height of 1.7meters and the length of 75 meters. Left-turning bridges on the main road were two viaducts, its middle length is 70 meters, the bridge surface appears slope trough-shaped , the top to floor is 4 meters, two left-turning roads of the main bridge appears slope trough-shaped, the bottom of the groove is 2.3 meters, and the length is 70 meters, the four left-turning lines converged in the center. Form two layers. the width is 16meters,four left-turning lines convergence with going-straight line and complete left-turning directly.

Each right-hand line of main line converges with going-straight line of left directly after turning. The height of turning is 2.5 meters with the length is 40 meters. There is a u-line set in all four directions. Vehicles can reverse direction without passing the bridge, and then convergence with the main line of relative direction. The non-motorized roads RO(R101)、 SO(S , 01) above the ground 0.5 meters , complete going-straight through RO(R101) to cross main road directly. The two non-motorized roads of main road appears slope trough-shaped , the depth of the slope bottom is 2 meters , across the main bridge to get going-straight, Then complete left-turning through so(s1o1).

Claims:

1. A new urban highway overpass, the three layers overpass system comprising: the main road AB(A1B1), the main bridge CD(C1D1), four left-turning bridges EF(E1F1, E2F2, E3F3), four right-turning bridges GH(G1H1, G2H2, G3H3), four non-motorized going-straight lines LM(L1M1, L2M2, L3M3), four u-lines NP(N1P1, N2P2, N3P3). The diameter of the overpass is 140 meters, the height and depth are both 4 meters, the main going-straight road appears slope trough-shaped the depth of the groove is 4 meters, the length is 75 meters and the width is 12 meters, the height of the going-straight line is 1.7 meters, with the width is 12 meters, the length of slope is 95 meters, the four left-turning lines converged in the center of the overpass formed an upper layer and a lower layer, the width of the center is 16 meters, with the length of the turning center is 70 meters, each right-turning line of main line convergence with going-straight line of left directly after turning. The height of the road's turning is 2.5 meters, with the total length is 170 meters and the width is 5 meters. with the four non-motorized roads, motor vehicles and non-motorized can complete left-hand turn and going-straight by driving separately, u-lines set in all four directions so vehicles can turn around without crossing the bridge, and then convergence with the main line of relative direction.
2. A new urban highway overpass according to claim 1, two going-straight lines of the main bridge were Viaduct, with the height of 1.7 meters and the length of 75 meters, left-turning bridges on the main road were two viaducts, its middle length is 70 meters, the bridge surface appears slope trough-shaped, the top to floor is 4 meters, two left-turning road of the main bridge appears slope trough-shaped, the bottom of the groove is 2.3 meters, and the length is 70 meters. the length of turning is 30 meters, the depth of the bottom of slope is 3.5 meters.
3. A new urban highway overpass according to claim 1, The non-motorized road RO(R1O1), SO(S, O1) above the ground 0.5 meters, complete going-straight through

RO(R101) to cross main road directly. The two non-motorized roads of main road appears slope trough-shaped , the depth of the slope bottom is 2 meters , across the main bridge to get going-straight, Then complete left-turning through so(s1o1).

### **Abstract**

The present invention provides a three-layered overpass including one main path, one main bridge, four left turn lanes, four right turn lanes, four straight non-motored vehicle lanes, and four turn-back lanes. The four left turn lanes are joined into the separate straight lanes smoothly to complete direct left turn. The overpass has separate lanes in different directions without conflict and interweaving. It has very small covered area and low building cost, has only single lane and no complicated road mark, and has separate lanes for motor vehicles and non-motor vehicles. With turn back lanes in different directions can solve traffic jamming.